Trend Study 17-11-02

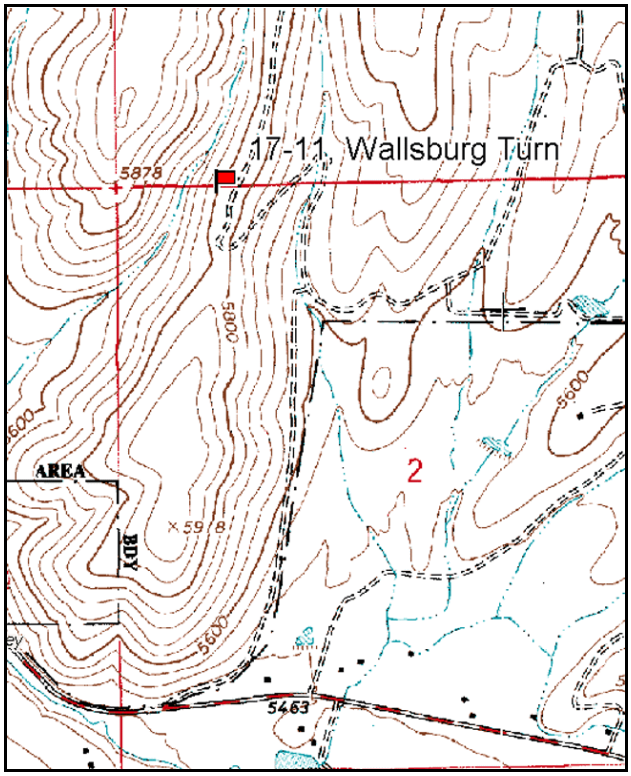
Study site name: Wallsburg Turn . Vegetation type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 338 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Rebar: belt 5 on 1ft., belt 4 on 2ft.

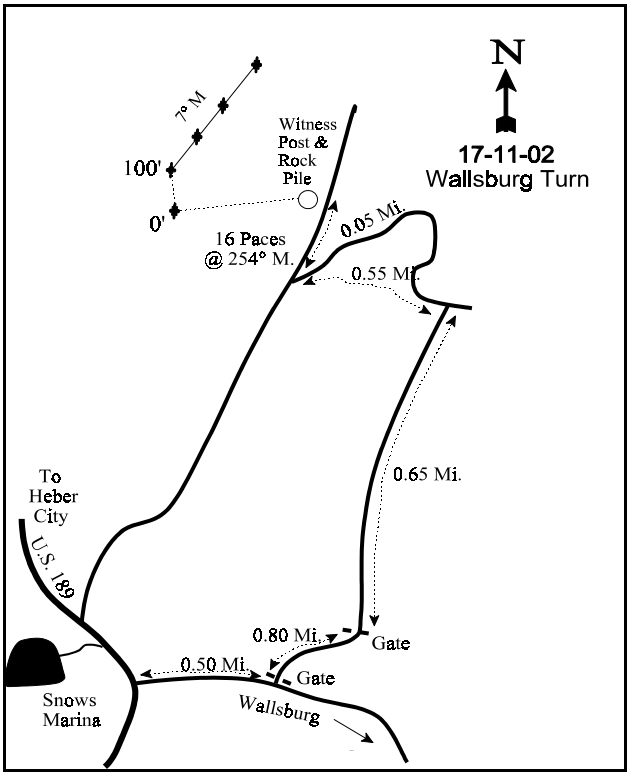
LOCATION DESCRIPTION

Beginning at the intersection of U.S. 189 and the Wallsburg turnoff, proceed 0.50 miles towards Wallsburg to an intersection. Turn left at the intersection and proceed northerly for 0.8 miles passing through two DWR gates. Continue on this road for 0.65 miles to an intersection. Take a left at the intersection and go 0.55 miles to another intersection. Go right for 0.05 miles to a small rock pile on the left (east) side of the road. From the rock monument, walk 16 paces at an azimuth of 264 degrees magnetic to the 0-foot baseline stake. The frequency baseline is marked by green steel "T" fenceposts approximately 12 to 18 inches in height.



Map Name: Charleston

Township 5S , Range 4E , Section 2



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4474214 N 460333 E

DISCUSSION

Wallsburg Turn - Trend Study No. 17-11

This study is on critical deer winter range located approximately 3/4 mile northeast from the junction of highways US-189 and U-222. The study site is on land owned by the Utah Division of Wildlife Resources near a broad ridge top. The site has a moderate (25%), west facing slope at an elevation of approximately 5,700 feet. The vegetational type is seeded grass on what formerly was a uniform stand of mountain big sagebrush and scattered antelope bitterbrush. In August of 1976, an exceptionally hot and all consuming wildfire destroyed virtually all the vegetation. A seeding effort conducted immediately after the fire appears to have been successful, resulting in fair grass cover and a resurgent sagebrush population. Aside from terrain features, the area is devoid of thermal or escape cover. Use of the site by elk is light, while deer use is moderate. Pellet group transect data collected in 2002 estimated 17 elk days use/acre (43 edu/ha) and 54 deer days use/acre (134 ddu/ha).

Soils have a silty clay loam texture and a slightly alkaline reactivity (pH of 7.6). Average soil temperature was 52°F measured at 11 inches in depth in 1996. Considerable erosion occurred after the fire because of insufficient ground cover. In 1983, it was reported that as vegetation increased, a net decrease in erosion should follow. This appears to be the case as herbaceous vegetation and litter cover have been high in 1996 and 2002. Bare soil is low at only 9% in 2002. An erosion condition class assessment done in 2002 gave soils a stable to slightly erosion rating. Pedestalling at the base of sagebrush and bunchgrass stems is severe and provides the most evidence of past erosion. The nested frequency ratio of protective cover to bare soil is good at over 4:1 in 2002.

Photo and data comparisons show a definite increase in the prominence of mountain big sagebrush on the burned area since site establishment. Mountain big sagebrush cover was estimated at 10% in 1996, increasing to almost 13% in 2002. Age structure has shifted to a more mature population in 1996 and 2002. Percent decadency is moderate at 26% in 2002. Density appears to have stabilized with an estimated population of 2,320 plants/acre in 1996 and 2,160 plants/acre in 2002. The slight decline is due to an increase in the number of dead plants in 2002. Recruitment from the young age class was high in 1983 and 1989, but declined to 8% in 1996 and 2% in 2002. Biotic potential (# of seedlings) has been low in all readings. Use was light in 1983, moderate in 1989, and moderate to heavy in 1996 and 2002. Vigor was mostly normal during the first three readings, with 14% of the population displaying poor vigor in 2002. Sagebrush leader growth averaged 1.4 inches in 2002.

Broom snakeweed density was estimated at 2,600 plants/acre in 1996, declining to 400 plants/acre in 2002. Snakeweed often decreases during dry periods so the decline in 2002 is typical of a drought year. Low rabbitbrush is increasing on the site. Density increased by almost seven-fold between 1996 and 2002 to 1,360 plants/acre. Although antelope bitterbrush was sampled in past years, it was not encountered in the density strips in 1996 or 2002. Bitterbrush plants are scattered across the landscape in low numbers and have been severely hedged.

The herbaceous understory dominates the vegetative component on this site. Sum of nested frequency for perennial grasses decreased in 1996, but slightly increased in 2002. Three species, crested wheatgrass, intermediate wheatgrass, and Sandberg bluegrass, are the most abundant species. Crested wheatgrass and intermediate wheatgrass provided 82% of the grass cover in 1996, increasing to 86% in 2002. The annuals, cheatgrass and Japanese brome, are present on the site but in low frequencies. The abundance of perennials will help keep cheatgrass in check. The site had not been grazed by livestock in 2002.

Forbs provided one-third of the total cover on the site in 1996 and 2002. However, only two species were particularly abundant in 2002, alfalfa and little flower collinsia. Alfalfa has steadily increased in nested frequency since 1983. Like crested wheatgrass, these plants were grazed in 1996. Weedy milkvetch was encountered in 1996 and 2002, but not in the two previous years. This plant is resistant to fire and is known to cause death in livestock. Many of the more abundant forbs encountered are annual species that do not provide much soil protection or forage. Sum of nested frequency for perennial and annual forbs declined in 2002 with drought.

1983 APPARENT TREND ASSESSMENT

Current soil condition is poor to fair but is probably improving. As the seeded vegetative community matures, erosion should become less of a problem. The coming years should see steady increases in productivity of browse and possibly even grasses. However, grass productivity will most likely level off or decrease first. Forb trend is more difficult to predict. Our best estimate is a stable situation that could easily go up or down. As a management objective, it would be desirable to have more diversity among palatable species of both shrubs and forbs.

1989 TREND ASSESSMENT

While vegetation cover increased, the amount of litter decreased due to livestock grazing. Rock and pavement cover increased from 30% to 48%. The amount of bare soil exposed remained fairly constant. The soil trend is stable. The vegetative trend also continues to improve after the fire and seeding. Browse trend is slightly up as mountain big sagebrush increased in density and the number of young plants make up 30% of the population. Trend for the herbaceous understory is up as perennial grasses and forbs showed increased sum of nested frequency values.

TREND ASSESSMENT
soil - stable (3)
browse - slightly up (4)
herbaceous understory - up (5)

1996 TREND ASSESSMENT

Soil trend is slightly upward. Erosion is not as substantial as was reported in the past. Slightly more bare ground cover was reported in 1996, but herbaceous vegetation and litter are more abundant and are well distributed over the site. The browse trend is stable. The increased density of mountain big sagebrush may be due to the greatly increased sample size used in 1996. However, vigor is good and the individual plants have increased in height and crown measurements. The broom snakeweed density has increased to 2,600 plants/acre, but this could be due to the increased sample size as well. While perennial grass nested frequency has decreased, perennial forb nested frequency has increased. Alfalfa is still one of the dominant forbs present with a stable nested frequency since 1989. Crested wheatgrass nested frequency has increased slightly, but intermediate wheatgrass and Sandberg bluegrass nested frequencies have both declined. Annual grasses are scattered throughout and do not appear to be increasing at this time. Herbaceous understory trend is stable.

TREND ASSESSMENT
soil - slightly upward (4)
browse - stable (3)
herbaceous understory - stable (3)

2002 TREND ASSESSMENT

Trend for soil is up slightly. Vegetation and litter cover slightly increased, and bare soil slightly decreased. The nested frequency ratio of protective cover to bare soil improved to over 4:1. Erosion remains slight on the site as evidenced by pedestalling around sagebrush and bunchgrass stems. Trend for browse is stable. Mountain big sagebrush density slightly decreased with a decline in the number of young in the population. Poor vigor and decadency both increased in 2002, but with drought, these increases are expected and are not unreasonable. Trend for the herbaceous understory is stable. Sum of nested frequency for perennial grasses increased while that of perennial forbs decreased. The most abundant perennial species, crested wheatgrass, intermediate wheatgrass, Sandberg bluegrass, and alfalfa all increased in frequency except for crested wheatgrass which slightly decreased.

TREND ASSESSMENT
soil - up slightly (4)
browse - stable (3)
herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Herd unit 17 , Study no: 11

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'96	'02	'83	'89	'96	'02	'96	'02
G	Agropyron cristatum	a169	ab195	b220	ab196	73	73	75	73	8.60	11.37
G	Agropyron intermedium	a84	d260	b138	c191	36	91	48	71	4.97	7.65
G	Agropyron spicatum	b53	c-	a7	a3	22	-	2	1	.53	.38
G	Bromus japonicus (a)	-	-	-	3	-	-	-	2	-	.01
G	Bromus tectorum (a)	-	-	28	36	-	-	9	13	.57	.62
G	Festuca ovina	3	-	-	-	2	-	-	-	-	-
G	Poa secunda	a54	c178	b126	b127	23	73	54	53	1.93	2.11
G	Vulpia octoflora (a)	-	-	-	2	-	-	-	1	-	.00
Total for Annual Grasses		0	0	28	41	0	0	9	16	0.56	0.63
Total for Perennial Grasses		363	633	491	517	156	237	179	198	16.04	21.52
Total for Grasses		363	633	519	558	156	237	188	214	16.61	22.16
F	Agoseris glauca	a-	a-	b12	ab8	-	-	6	3	.08	.04
F	Alyssum alyssoides (a)	-	-	b124	a11	-	-	46	6	.33	.03
F	Allium spp.	a1	a2	a1	b23	1	2	1	13	.00	.17
F	Artemisia ludoviciana	-	1	-	-	-	1	-	-	-	-
F	Astragalus miser	a-	a-	c40	b20	-	-	19	12	1.05	.16
F	Castilleja linariaefolia	-	-	8	8	-	-	3	5	.01	.22
F	Calochortus nuttallii	1	-	-	2	1	-	-	2	-	.01
F	Castilleja spp.	-	-	8	-	-	-	4	-	.04	-
F	Cirsium spp.	-	-	3	-	-	-	1	-	.00	-
F	Collomia linearis (a)	-	-	b82	a6	-	-	36	3	.18	.01

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'96	'02	'83	'89	'96	'02	'96	'02
F	Collinsia parviflora (a)	-	-	$_{a}$146	$_{b}$245	-	-	56	74	1.02	8.10
F	Cymopterus spp.	$_{a}$-	$_{a}$-	$_{b}$17	$_{ab}$8	-	-	7	4	.09	.07
F	Delphinium nuttallianum	-	-	1	-	-	-	1	-	.00	-
F	Draba spp. (a)	-	-	30	28	-	-	17	10	.22	.05
F	Erigeron divergens	$_{a}$-	$_{a}$-	$_{b}$45	$_{a}$-	-	-	21	-	.13	-
F	Eriogonum racemosum	8	16	22	15	6	10	11	8	.27	.18
F	Gayophytum ramosissimum (a)	-	-	3	-	-	-	3	-	.01	-
F	Helianthus annuus (a)	$_{a}$3	$_{b}$23	$_{a}$-	$_{a}$3	2	12	-	1	-	.00
F	Holosteum umbellatum (a)	-	-	$_{b}$194	$_{a}$97	-	-	67	43	.53	.56
F	Lactuca serriola	$_{b}$16	$_{a}$-	$_{a}$6	$_{a}$-	9	-	2	-	.01	-
F	Medicago sativa	$_{a}$22	$_{b}$77	$_{b}$78	$_{b}$95	10	34	33	44	10.93	8.77
F	Microsteris gracilis (a)	-	-	$_{a}$-	$_{b}$11	-	-	-	5	-	.02
F	Polygonum douglasii (a)	-	-	2	2	-	-	2	1	.01	.00
F	Ranunculus testiculatus (a)	-	-	29	36	-	-	12	15	.06	.12
F	Sanguisorba minor	2	-	-	-	1	-	-	-	-	-
F	Sphaeralcea coccinea	3	-	2	-	1	-	2	-	.03	-
F	Tragopogon dubius	-	-	2	-	-	-	2	-	.01	-
Total for Annual Forbs		3	23	610	439	2	12	239	158	2.38	8.92
Total for Perennial Forbs		53	96	245	179	29	47	113	91	12.69	9.63
Total for Forbs		56	119	855	618	31	59	352	249	15.08	18.55

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Herd unit 17 , Study no: 11

Type	Species	Strip Frequency		Average Cover %	
		'96	'02	'96	'02
B	Artemisia tridentata vaseyana	62	64	10.17	12.65
B	Chrysothamnus viscidiflorus viscidiflorus	8	28	.52	.61
B	Gutierrezia sarothrae	42	10	1.18	.05
B	Opuntia spp.	6	5	.16	.30
Total for Browse		118	107	12.04	13.61

CANOPY COVER -- LINE INTERCEPT
Herd unit 17 , Study no: 11

Species	Percent Cover	
	'96	'02
Artemisia tridentata vaseyana	-	13.67
Chrysothamnus viscidiflorus viscidiflorus	-	.67
Gutierrezia sarothrae	-	.05
Opuntia spp.	-	.17

Key Browse Annual Leader Growth
Herd unit 17 , Study no: 11

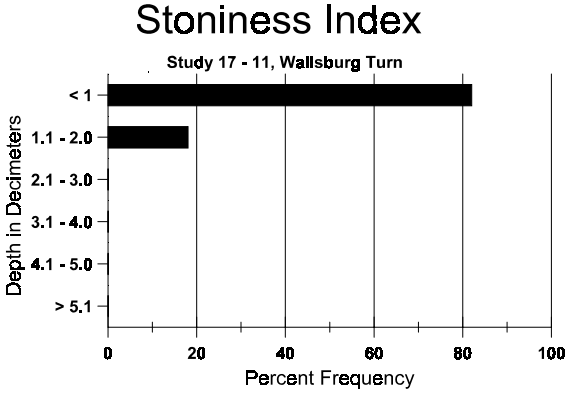
Species	Average leader growth (in)
	'02
Artemisia tridentata vaseyana	1.4

BASIC COVER --
Herd unit 17 , Study no: 11

Cover Type	Nested Frequency		Average Cover %			
	'96	'02	'83	'89	'96	'02
Vegetation	368	364	5.75	18.75	44.34	48.84
Rock	277	219	10.75	15.50	11.94	8.77
Pavement	265	253	19.00	32.00	9.28	7.74
Litter	395	385	39.25	27.00	41.57	44.34
Cryptogams	158	71	18.50	1.50	2.24	1.72
Bare Ground	247	190	6.75	5.25	11.85	8.97

SOIL ANALYSIS DATA --
Herd Unit 17, Study no: 11, Wallsburg Turn

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
8.9	52.4 (10.7)	7.6	18.9	53.0	28.0	3.1	16.3	156.8	.5



PELLET GROUP FREQUENCY --
Herd unit 17 , Study no: 11

Type	Quadrat Frequency		Pellet Transect	
			Pellet Groups per Acre	Days Use per Acre (ha)
	'96	'02	'02	'02
Rabbit	2	5	-	-
Elk	7	6	226	17 (43)
Deer	12	20	705	54 (134)
Cattle	2	-	-	-

BROWSE CHARACTERISTICS --
Herd unit 17 , Study no: 11

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Artemisia tridentata vaseyana																		
S	83	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	83	7	-	-	-	-	-	-	-	-	7	-	-	-	233			7
	89	8	6	-	-	-	-	-	-	-	14	-	-	-	466			14
	96	8	1	-	-	-	-	-	-	-	9	-	-	-	180			9
	02	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	83	34	-	-	-	-	-	-	-	-	34	-	-	-	1133	14	13	34
	89	13	16	2	1	-	-	-	-	-	32	-	-	-	1066	18	19	32
	96	11	72	20	-	3	-	-	-	-	100	1	-	5	2120	20	36	106
	02	14	31	33	-	-	-	-	-	-	72	-	6	-	1560	25	35	78
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	1	13	14	-	-	-	-	-	-	19	-	2	7	560			28
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	160			8

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	+11%
'89	48%	04%	00%	+34%
'96	66%	17%	04%	- 7%
'02	41%	44%	14%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:
	'83	1366	0%
	'89	1532	0%
	'96	2320	1%
	'02	2160	26%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus viscidiflorus																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	83	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	89	5	-	-	1	-	-	-	-	-	6	-	-	-	200			6
	96	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	83	1	-	-	-	-	-	-	-	-	1	-	-	-	33	10	17	1
	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33	5	5	1
	96	6	-	-	-	-	-	-	-	-	6	-	-	-	120	10	17	6
	02	59	-	-	2	-	-	-	-	-	61	-	-	-	1220	7	11	61
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	6	-	-	-	-	-	-	-	-	6	-	-	-	120			6
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	+75%
'89	00%	00%	00%	-25%
'96	00%	00%	00%	+85%
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	66	Dec:	0%
	'89	266		12%
	'96	200		0%
	'02	1360		9%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	22	-	-	-	-	-	-	-	-	22	-	-	-	440			22
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	16	-	-	-	-	-	-	-	-	16	-	-	-	320			16
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	4	-	-	-	-	-	-	-	-	4	-	-	-	133	10	13	4
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	114	-	-	-	-	-	-	-	-	114	-	-	-	2280	8	12	114
	02	16	-	-	-	-	-	-	-	-	16	-	-	-	320	7	5	16
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'96	00%	00%	00%	-85%
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	133	Dec:	0%
	'89	0		0%
	'96	2600		0%
	'02	400		20%

Opuntia spp.																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	3	-	-	-	-	-	-	-	-	3	-	-	-	100	6	8	3
	89	3	-	-	-	-	-	-	-	-	3	-	-	-	100	6	14	3
	96	6	-	-	-	-	-	-	-	-	6	-	-	-	120	5	19	6
	02	7	-	-	-	-	-	-	-	-	7	-	-	-	140	5	36	7

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	+ 0%
'89	00%	00%	00%	+17%
'96	00%	00%	00%	+14%
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	100	Dec:	-
	'89	100		-
	'96	120		-
	'02	140		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Purshia tridentata																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	2	1	-	-	-	-	-	-	-	3	-	-	-	100			3
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	1	16	-	-	-	-	-	-	-	17	-	-	-	566	16	20	17
	89	9	5	5	-	-	-	-	-	-	19	-	-	-	633	15	32	19
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	18	69	0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	94%	00%	00%	+23%
'89	27%	23%	00%	
'96	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	566	Dec:		-
'89	733			-
'96	0			-
'02	0			-